

Aerodynamic interference simulation between the rotor and the wing

Report Number: R22ETET43

Subject Category: Skills Acquisition System

URL: <https://www.jss.jaxa.jp/en/ar/e2022/20889/>

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● Abstract

Investigate the aerodynamic interference between the rotor and the wing in high-speed helicopters to contribute to the research and development of helicopters.

Ref. URL: <https://kitnet.jp/laboratories/labo0022/index.html>

● Reasons and benefits of using JAXA Supercomputer System

The analysis of the aerodynamic interaction between the rotor and the wing using the helicopter aerodynamic analysis code rFlow3D is computationally intensive.

● Achievements of the Year

The aerodynamic interaction between the rotor and the wing of a compound helicopter could be simulated in high speed flight (Fig.1) . The aerodynamic interaction between the rotor and the wing of a tandem compound helicopter could be simulated in hover (Fig.2) .

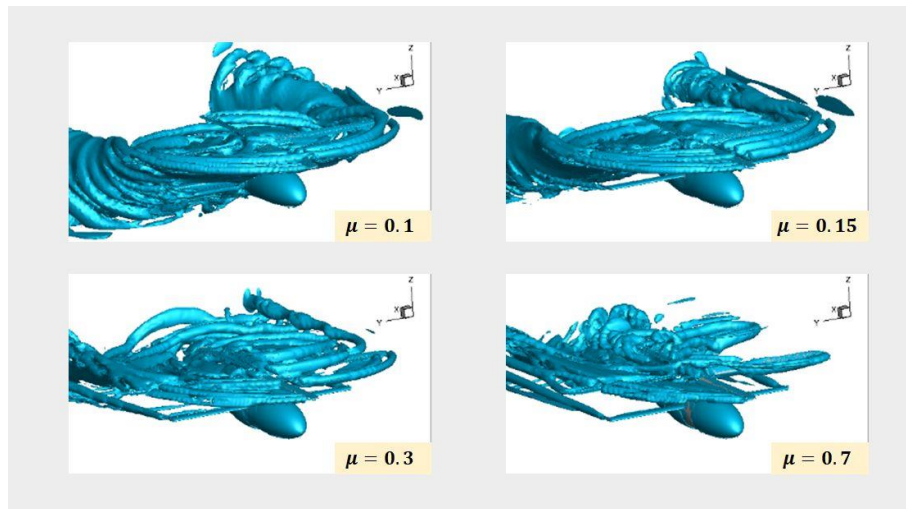


Fig. 1: Rotor/Wing aerodynamic interference in forward flight

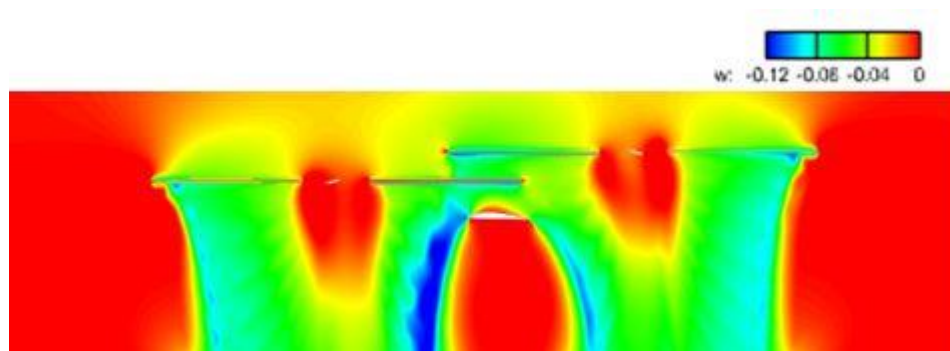


Fig. 2: Tandem Rotor/Wing aerodynamic interference in hover

● **Publications**

N/A

● **Usage of JSS**

● **Computational Information**

Process Parallelization Methods	N/A
Thread Parallelization Methods	OpenMP
Number of Processes	1
Elapsed Time per Case	336 Hour(s)

● JSS3 Resources Used

Fraction of Usage in Total Resources*1(%): 0.81

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage*2(%)
TOKI-SORA	0.00	0.00
TOKI-ST	6,466,035.15	6.46
TOKI-GP	0.00	0.00
TOKI-XM	0.00	0.00
TOKI-LM	0.00	0.00
TOKI-TST	18.60	0.00
TOKI-TGP	0.00	0.00
TOKI-TLM	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage*2 (%)
/home	24.24	0.02
/data and /data2	9,015.65	0.07
/ssd	247.61	0.03

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2 (%)
J-SPACE	0.00	0.00

*1: Fraction of Usage in Total Resources: Weighted average of three resource types (Computing, File System, and Archiver).

*2: Fraction of Usage : Percentage of usage relative to each resource used in one year.

- **ISV Software Licenses Used**

ISV Software Licenses Resources		
	ISV Software Licenses Used (Hours)	Fraction of Usage ^{*2} (%)
ISV Software Licenses (Total)	485.09	0.34

^{*2}: Fraction of Usage : Percentage of usage relative to each resource used in one year.